Septic Systems

All sewage should be treated to at least secondary, preferably, tertiary levels before being discharged into the ground. The following simple septic system design can effectively treat sewage wastes and even be a source of water for irrigation of hotel gardens. The important feature is the addition of a final treatment step through the use of constructed, or artificial, wetlands as part of a "drain field" on top of the second tank.

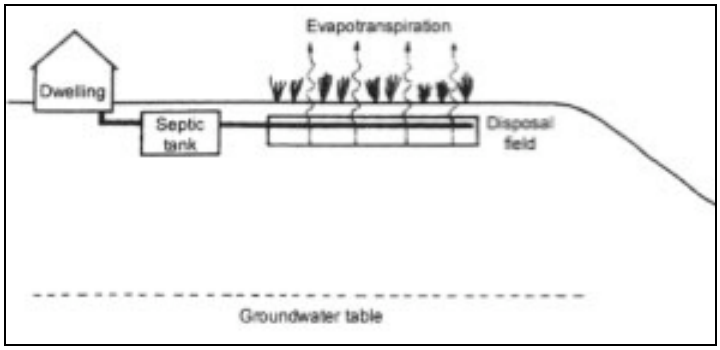
Traditional septic systems consist of 3 components:

- **Receiving tank** – typically an impermeable concrete underground holding chamber which retains the solid wastes and where the process of biological decomposition of the solid waste occurs. Towards the top of the chamber is an opening that allows the liquid portion of the sewage to "overflow" into a second tank. Excessive grease (such as from kitchens) can clog this opening.

- **Second tank with drain field** (also called leach field) - a second concrete tank with two compartments containing gravel. **Wetlands plants** are planted over the "drain field". These plants' root systems serve as filters of the wastewater that is exiting from the tank. and remove the nutrients and undesirable components from the wastewater.

- **Garden** – native plants are planted around the perimeter of the drain field to take up more of the remaining wastewater nutrients. This minimizes the growth of algae, seaweed, and other undesirable plants that the excess nutrients might otherwise encourage.

One of the major advantages of this system is that it does not require chemicals, pumps or other mechanical devices. The only maintenance required is the occasional de-sludging of the first septic tank, and pruning of the wetland plants on the two tanks to stimulate their growth. This cut vegetation can then be used for animal fodder or supplies for artisanal baskets or weavings (it is not recommended for human consumption).



Siting of Septic Systems

Poorly located, poorly designed, or poorly maintained septic systems can have serious negative impacts by polluting surface water bodies and ground water stores. Taking the following steps into consideration can greatly minimize these potential impacts.

1. Consider the location of existing water wells and buildings, both on-site and in adjacent areas. To minimize the risks of contamination,septic systems must be located at least:

- 30 meters away from any water wells;
- 7 meters from any stream, cuts or embankments;
- 1.5 meters from any paths, walls, buildings or property boundaries; and
- 3 meters from swimming pools or large trees.

Situations where contours or steep slopes exist, particularly where soils are porous, may warrant an even greater distance between septic systems and water wells.

2. Evaluate depth of water table after rainy season to avoid contamination. Leachate liquids (the waste after solids have been separated out) should not flow towards wells or into the water table. Establishing the *highest level of the water table* after the rains and locating the septic system *above this level* will help to eliminate any chance of water contamination from wastewater.

3. Consider the soil type and contour of bedrock. Septic systems should be located at least one meter above the underground rock ledge to minimize possibility of leachate liquids flowing along the top of the rock ledge and into the groundwater or directly into the sea.

Source: Tanzania Ministry of Natural Resources & Tourism. 2003. *Guidelines for Coastal Tourism Development in Tanzania*. Tanzania Coastal Management Partnership.